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TITLE: (DEPSCOR-92) Acquisition of a Metallurgical Optical Microscope

AUTHOR: Dr Krchnavek
Washington University
St Louis, Missouri 63130

AFOSR-TR- 95 0115

F49620-93-1-0591 FINAL REPORT

This DEPSCoR award was an equipment grant to acquire a high-performance metallurgical microscope with optical imaging analysis capability. The system assembled includes a high-power optical microscope, a visible and infrared (λ<1.6 μm) imaging system, computerized analysis of video images, and Michelson interferometer and Abbe refractometer components for characterizing optical materials.

The equipment is currently being utilized by two groups studying materials. The Photonics Research Laboratory is studying organic polymer materials for photonic applications (*Fundamental Characterization of Advanced Organic Polymers for Optical Waveguide Devices*, F30602-94-C-0006 and *A Study of Birefringence in Poled Films of Advanced Organic Polymers*, F30602-95-C-0024). The photonics group is also studying excimer laser chemical vapor deposition of semiconductor nanocrystals for optical applications. The Magnetics Information Science Center is using the equipment to analyze magnetic recording head structures.

Equipment List

The $63,642.00 grant with matching funds of $3,350.00 was used to purchase the equipment described below. The final pieces of equipment were in place in October, 1994.

Olympus BX60 optical microscope system (infinity corrected reflecting/transmitting optical microscope with Nomarski interference contrast, polarized light, brightfield, darkfield, objectives (5X, 10X, 20X, 50X, 100X), magnification changer, illumination systems, camera mounts, auto-exposure system, visible camera system.)	$25,793.00
Infrared imaging system (Hamamatsu IR Vidicon system, monitor, zoom lens system, illuminators, low-power microscope, adapters.)	$18,804.35
Computer acquisition and analysis system (computer with video capture board, video printer, hard drive for image storage, image analysis computer with software, printer, cart)	$12,986.35
Miscellaneous components (precision xyz-translation stages for sample manipulation, rotation and tilt stages for sample manipulation, infrared viewers, stereo-zoom, optical and mechanical components for Michelson interferometer, refractometer components)	$9,408.30

Publications

This equipment has played a significant role in our research programs. Several publications that have benefitted from the equipment are under preparation. The following publications contain information obtained through the use of this equipment:

C. F. Kane and R. R. Krchnavek, "The Processing and Characterization of Benzocyclobutene Optical Waveguides," *IEEE Transactions on Components, Packaging and Manufacturing Technology for Advanced Packaging*, accepted for publication.

C. F. Kane and R. R. Krchnavek, "Benzocyclobutene Optical Waveguides," *IEEE Photon. Technol. Lett.*, in press, May, 1995.

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